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Childhood attention deficit hyperactivity disorder features in adult mood disorders

Eun-Jeong Joo[a], Kyu Young Lee[a], Kyeong-Sook Choi[b], Se Hyun Kim[c], Joo Youn Song[c], Yang Weon Bang[d], Yong Min Ahn[c], Yong Sik Kim[c,*]

[a]Department of Neuropsychiatry, Eulji University School of Medicine, Eulji General Hospital, Seoul, South Korea
[b]Department of Neuropsychiatry, Eulji University School of Medicine, Eulji University Hospital, Daegeon, South Korea
[c]Department of Psychiatry and Behavioral Science and Institute of Human Behavioral Medicine, Seoul National University College of Medicine, Seoul 110-744, South Korea
[d]Department of Psychiatry, Keyo Hospital, Uiwang, South Korea

Abstract

A significant overlap between childhood mood disorders and many aspects of attention deficit hyperactivity disorder (ADHD) has been established. High rates of co-occurrence, familial aggregation, and more severe clinical manifestations of the illnesses when they are comorbid suggest that common genetic and environmental factors may contribute to the development of both disorders. Research on the co-occurrence of childhood ADHD and mood disorders in childhood has been conducted. We retrospectively investigated childhood ADHD features in adults with mood disorders. Childhood ADHD features were measured with the Korean version of the Wender Utah Rating Scale (WURS). The sample consisted of 1305 subjects: 108 subjects were diagnosed with bipolar disorder type I, 41 with bipolar disorder type II, 101 with major depressive disorder, and 1055 served as normal controls. We compared total WURS scores as well as scores on 3 factors (impulsivity, inattention, and mood instability and anxiety) among the 4 different diagnostic groups. The 4 groups differed significantly from one another on all scores. The group with bipolar disorder type II obtained the highest total scores on the WURS. The impulsivity and inattention associated with childhood ADHD were more significantly related to bipolar disorder type II than with bipolar disorder type I. The mood instability and anxiety associated with childhood ADHD seem to be significantly related to major depressive disorder in adulthood. In conclusion, multifactorial childhood ADHD features were associated with mood disorders of adulthood.

1. Introduction

Attention deficit hyperactivity disorder (ADHD) is a common psychiatric disorder in children and has been more frequently diagnosed in adults during recent years. Although the main features of ADHD are hyperactivity, inattention (INATT), and impulsivity (IMP), associated emotional and cognitive problems are also common. Attention deficit hyperactivity disorder is often associated with various comorbid conditions such as mood disorders, anxiety disorders, conduct and learning disorders in children, and substance use disorders in adults [1]. Mood disorders including bipolar disorder type I, bipolar disorder type II, and major depressive disorder are commonly found in children and adults with ADHD.

The relationship between ADHD and bipolar disorder has been studied by many researchers. Attention deficit hyperactivity disorder has been diagnosed in up to 85% of children with bipolar disorder, and bipolar disorder has been found in up to 22% of children with ADHD [2,3]. About 16% of adult patients with bipolar disorder have also been diagnosed with adult ADHD [4,5], and approximately 10% of ADHD patients develop bipolar disorder [6]. In addition to the high comorbidity of ADHD and bipolar disorder, ADHD is 3 times more common in the relatives of bipolar patients than in those of normal controls, and bipolar disorder is twice as common in the relatives of ADHD patients as in those of normal controls [7]. The high co-occurrence of bipolar disorder and ADHD and the high rate of comorbidity between major depressive

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* Corresponding author. Tel.: +82 2 2072 2204; fax: +82 2 744 7241.
E-mail address: kys@snu.ac.kr (Y.S. Kim).

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disorder and ADHD have also been found in youth, teenagers, and young female adults [8-10].

Genes are considered to constitute an important etiologic factor in both mood disorders and ADHD. The heritability rates of bipolar disorder and major depressive disorder have been estimated between 36% and 70%, respectively [11]. The heritability of ADHD has been estimated to be as high as 80% [12]. Taken together, these studies suggest that mood disorders and ADHD share some common genetic characteristics and may operate on a common genetic pathway involving multiple genes [13]. According to a different perspective, it is possible that the ADHD features observed in mood disorders may derive from a different genetic source from that involved in the etiology of mood disorders or ADHD. Based on this view, ADHD features have been used to represent useful subphenotypes for mapping studies focused on mood disorders [14].

Comorbidity may implicate not only a common genetic etiology but also a particularly complex clinical picture. Usually, more severe mood disorders are associated with comorbid ADHD. Adult bipolar disorder with a history of childhood ADHD has shown a different disease course, irrespective of the presence of current adult ADHD. Adult patients with bipolar disorder and childhood ADHD had a significantly earlier age at onset of their first affective episode, more frequent affective episodes, and more interpersonal violence than did bipolar disorder patients without ADHD [5]. Another study also showed the unfavorable effect of childhood ADHD on the response to pharmacotherapy with mood stabilizers [15]. Youth with comorbid major depressive disorder and ADHD also reported more frequent recurrence of depression [16], earlier age at onset, longer duration of depressive illness, and a higher rate of suicidality and hospitalization compared with depression without ADHD [10].

The present study examined childhood ADHD features among adults with mood disorders. Our primary hypothesis was that childhood ADHD features would be observed more frequently in patients with mood disorders than in normal controls. Childhood ADHD features were retrospectively measured with the Wender Utah Rating Scale (WURS). Because the WURS addresses the complex emotional and behavioral symptoms of ADHD, scores on 3 established factors have been applied in further analyses. Bipolar disorder type I, bipolar disorder type II, and major depressive disorder were included for comparisons of WURS scores. Because our secondary hypothesis was that those with different mood disorders may differ with respect to the severity of their childhood ADHD features, we divided the bipolar disorder group into types I and II.

2. Methods

2.1. Subjects

A total of 250 patients with mood disorders and 1055 normal controls were included in this study. Patients with mood disorders included 108 with bipolar disorder type I, 41 with bipolar disorder type II, and 101 with major depressive disorder. Diagnoses were assigned to each patient according to the criteria in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* via consensus achieved at a diagnostic meeting. At least 2 different psychiatrists reviewed and discussed psychiatric data, including psychiatric interviews conducted by research nurses, and medical records to reach a consensus on the final diagnoses of each patient. Patients with organic brain syndrome, substance use, and any general medical condition that might have a psychiatric manifestation were excluded from the study. Controls were randomly recruited from normal volunteers after a brief psychiatric interview. Exclusion criteria for the control group included lifetime histories of major psychiatric illness and brain trauma. Whether subjects (both patients and controls) have the diagnosis of ADHD based on the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* in their childhood and current state was not evaluated in this study. This study was approved by the ethics committees of both Eulji General Hospital and Seoul National University Hospital. All subjects signed a written informed consent form.

2.2. Measurement of ADHD features

The WURS, a self-administered instrument, retrospectively measures ADHD symptoms experienced by individuals before age 12 years. Each item is rated on a 4-point scale. We used a short version of the WURS that was translated into Korean. The Korean version consisted of 25 items drawn from the original WURS that had been shown to be valid and reliable in Western countries [17]. This version has been tested for internal validity, and factor analysis has been performed with normal female Korean adults [18].

2.3. Statistical methods

2.3.1. Factor analysis

A principal components analysis was conducted to obtain factor scores. The Kaiser-Meyer-Olkin measure of sampling adequacy (0.95) and Barlett test of sphericity (significance was set at <.001) showed that this sample was appropriate for the factor analysis. Because previous studies have shown that WURS-K has a similar 3-factor structure [14,19,20], we performed factor analysis under the condition of only 3 factors could be extracted. The 3 factors were correlated one another; promax rotation was performed to maximize the loading of each variable on one of the extracted factors and to minimize the loading on all other factors. Rotation converged after 9 iterations. SPSS-K 12.0 was used for the analysis (SPSS, Chicago, IL).

2.3.2. Analysis of variance and analysis of covariance tests

We compared the age at interview and age at onset of each diagnostic group using analysis of variance (ANOVA). Post hoc comparisons were performed with Tukey HSD using SPSS-K 12.0. Because the mean age at interview was significantly different among patient groups and the age was correlated to IMP factor and INATT factor of WURS